Risck Factor for Hepatitis B Family Transmission in Kupang Province of East Nusa Tenggara, Indonesia

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ABSTRACT

Background: Hepatitis B ~~caused by hepatitis virus infection B (HBV)~~ is a worldwidw problem caused by hepatitis B virus (HBV) ~~health problem including Indonesia~~. ~~Results of 2013~~ Basic Health Research 2013 estimated that there were 1,2% of the population in Indonesia with Hepatitis and the highest prevalence was in the East Nusa Tenggara ~~was the province with the highest Hepatitis B prevalence~~ (4,3%). Transmission can be through vertical (perinatal) and horizontal (~~house~~ home contact). **Aims;** ~~The purpose of this study was~~ to analyze the risk factors for transmission at home contact from students with HBsAg reactive. **Methods;** ~~This study was performed in two phases. The first phases~~, on November 2015, there was a screening examination of HBsAg status with ELISA sandwich method ~~was conducted~~ on 341 students of Kota Kupang Senior High School ~~Kupang city~~ and obtained 45 samples with HBsAg reactive. ~~The second phase~~, continued seven months later On June 2016, ~~out of~~ 23 students were still reactive to HBsAg ~~positive cases.~~ After examination with HBsAg reactive, there were ~~and~~ 89 samples of family members become respondents. ~~were enrolled and evaluated. Of family members, 18 samples were found with HBsAg reactive, 6 subjects (33%) were fathers, 4 subjects (22%) were mothers, 5 subjects (28 %) were sisters and 2 subjects (11%) were brothers and 1 subject (6%) were others family members.~~ The data were statistically with ~~Statistical analysis~~ with Chi Square (X^2) and Odds Ratio. **Results:** There was ~~is~~ no significant relationship between HBsAg status with sex and age. But there was ~~There is~~ a significant relationship between HBsAg status with education, and marital status. ~~The values were obtained (OR=0,184, 95%, Cl; 0,059-~~

0,579) for education and (OR=0,204, 95%, Cl; 0,07 0,597) for marital status. **Conclusion;** The presence of family members with reactive HBsAg could can transmit to other family members. 25% of family members also detected reactive HBsAg. More attention should be paid to HBV vaccination for family members. The higher education and unmarried family member could minimiza the intrafamilial transmission on HBV.

Keywords: Risk Factors, Home Contact, HBsAg Reactive

Introduction

Hepatitis B virus (HBV) infection is a serious global public health problem[1,2]. The infection may be transmitted through sexual intercourse, parenteral contact or from an infected mother to the baby at birth and, if contracted early in life, may lead to chronic liver disease, including cirrhosis and hepatocellular carcinoma[3,4].

HBV infection has a worldwide distribution. It is estimated that more than 2 billion people have been infected[5,6]. Of these, approximately 240 million are chronically infected and at risk of serious illness and death from cirrhosis and hepatocellular carcinoma (HCC)[1,2], diseases that are estimated to cause 500 000–700 000 deaths each year worldwide[1,2,5].

HBV is carried in blood and other body fluids, including saliva, tears, semen and vaginal secretions[7,8], carried HBV and become the media of transmission. HBV is transmitted by contact with infected blood and body fluids. Depending on the epidemiological pattern within a geographic area, the main ways of transmission are sexual intercourse, parenteral contact or infection of the baby at birth from an infected mother[35]. One of the most important factor that contributes was the mother transmission to children (MTCT), also called vertical transmission from pregnant women to their children during pregnancy[8,9,10].

~~Basic~~ National Health Research Result 2013 ~~of the 2013~~ estimated 7.1% prevalence of HBsAg. This result leaving from 9.4% in 2007[11] and means that Indonesia moving from high to moderate endemicity of Hepatitis B. The five provinces with the highest prevalence of hepatitis are East Nusa Tenggara (4.3%), Papua (2.9%), South Sulawesi (2.5%), Central Sulawesi (2.3%) and Maluku (2.3%). Kambuno[12] reported the prevalence of positive HBsAg in the Blood Transfusion Unit of PMI in the Province of East Nusa Tenggara 2017 was 3.5%. Other studies report that HBV infection data in hemodialysis patients in general hospitals Prof. Dr. W.Z. Johannes Kupang was 11%[13].

HBV infection was strongly associated with having a family member infected with hepatitis B, mainly mother, father and/or siblings sharing personal objects, and having history of blood transfusion[7,~~14,15,16,17~~]. Some previous studies have demonstrated that sharing personal objects with family members (safety razor, dishes, cutlery, glasses, face towels, and toothbrush) is strongly associated with HBV transmission[17,18]. Several studies have already reported the transmission by sharing infected objects. Therefore, drug users, who share syringes and other objects contaminated with blood, usually have a high risk of HBV infection[15,19].

Alizadah et all,[20] reported one hundred and fifteen family members including mothers, fathers, sisters, brothers, daughters, and sons, husbands, and wives were enrolled. Twelve (11%) of all family members were HBsAg positive. Fifty (56.2%) were isolated HBsAb positive and only one person (2.5%) was isolated HBcAb positive. Brother and father were having higher rates of HBsAg marker[21]. ~~Higher rates of HBsAg marker were detected in the brothers and fathers~~[21].

Kambuno[22] found transmission of HBV infection of 15.15% in ~~household~~ home contact, and further research showed that there was no relationship between sex, age, education, and marital status with hepatitis B infection[13,22]. ~~The aim of~~ this study aimed to analyze the risk factors of

family transmission ~~hepatitis B virus~~ HBV from students with reactive HBsAg.

Methods

This research ~~was conducted~~ consisted ~~in~~ of 2 phases, the first phases was a screening test of ~~taking~~ 341 blood samples at ~~3~~ three high schools in Kupang City ~~in~~ on November 2015. There were 45 students (13,2%) had HBsAg positive. The second phases, ~~sampling was~~ carried in July 2016 ~~out at the homes of~~ was taking 23 students and 89 members of theirs family with reactive HBsAg. ~~who were detected as reactive HBsAg and carried out.~~ The sample used was venous blood from students, and members of the student household contact with 5 ml for each probandus and stored at 4^{o}C.

Data were analyzed statistically with chi square and ~~using SPSS software (Statistical Package for Social Sciences, v. 16.0, Chicago, IL, USA) To determine the relationship between sex, age, education, occupation, marital status and HBsAg status and to calculate the analysis of risk factors that most influence on transmission of Hepatitis B then the test is continued with~~ the Crammar Coefficient Analytic Correlation test.

~~This research was registered with the~~ Code of Ethics Commission at the Faculty of Medicine, University of Nusa Cendana has registered this research UN-15050021.~~and has received a research ethics permit with Number~~ All students and family members who are sampled in this study will be asked for willingness by signing an informed consent.

Results

~~Of 341 students who were respondents of this study, 45 students were found HBsAg positive in Nopember 2015. The second phases, 23 students were found with HBsAg positive for 6 months (July 2016). A total of 23 (47% males: 53% female) chronic HBV carriers (mean age: 17,5.09 ±9.7 yr) and 89 (48% male: 52% female) members of their family (mean age: 42.02~~

±14.7) were enrolled in the study. The distribution of 23 students with chronic HBV carriers is shown in Table 1.

After the first screening on November 2015, there were 45 students with HBsAg positive. But, in the next six month, there were only 23 students still lived with HBsAg positive.

Table 1 Characteristic of students with chronic HBV carriers

Variable	n
Age;	
• 15 – 16	10
• 17 - 18	13
Gender;	
• Male	11
• Female	12
Vaccination status	
• Vaccinated	23
• Non Vaccinated	0
Family size	
• ≤5	17
• ≥5	6

The family members include 24 mothers, 29 fathers, 16 sister, 11 brother, and 9 others family. The distribution of hepatitis B virologic markers in family members of index cases is shown in Table 2.

Table 2 Frequency distribution of hepatitis B markers in family members of index cases, n (%)

Table one showed that all the respondents (100.0%) had been vaccinated and still with HBsAg positive. It meant that they had chronic HBV carriers and became the transmission media in their family. Most of them (73.9%) lived with a small number of family members.

Family members	HBsAg positive
Fathers, n = 29	6 (33%)
Mothers, n = 24	4 (22%)
Sisters, n =16	5 (28%)
Brothers, n = 11	2 (11%)
Others, n =9	1 (6%)
n = 89	n = 18

Table two showed that the family members of these students were 89 people and only 20.2% of them who had HBsAg positive. The great contribution of family members on HBV transmission was parents group (55.6%) consisted of six fathers and four mothers and followed by sisters (27.8%).

~~Overall among the family members were evaluated, 25% were positive for HBsAg. The HBsAg positivity rate was determined in the family members with respect to their relationship to the index cases. Fathers and mothers with 27% and 22%, respectively, had the highest rates of HBsAg positivity in the family members and the lowest rate was related to brothers (17%) and others (15%).~~

~~The relationship between sex, age, education, marital status with HBsAg status and calculating the analysis of risk factors that most influence the transmission of Hepatitis B were tested with the Crammar Coefficient Analytic Correlation test. Statistical analysis continued with ODS Ratio analysis to see the highest risk factors. The distribution of the results of the valuation of the independent variables is shown in table 3.~~

Tabel 3. Charactersitic of family members

Variable	HBsAg status n = 89		p	OR (95%,Cl)
	positive	negative		
Age ≤16	10	35	0,819	0,828 (0,336-2,039)
≥16	8	36		
Sex			0,823	1,181 (0,488-2,861)
Female	9	34		
Man	9	37		
Education			0,003#	0,184 (0,059-0,579)
High	5	48		
Low	13	23		
Marital			0,005#	0,204 (0,07-0,597)
Unmarried	6	45		
Married	12	26		
Total	18	71		

~~Fourty five subjects (50,6%) were adults (> 16 years), 46 subjects (51.7%) were male, 53 subjects (59.6%) had high education (> junior high school),~~

~~and 51 subjects (57.3%) unmarried. Statistical test results showed, there was not significant relationship between age, sex with HBsAg status where p>0.05 was found. There was a significant relationship between education, marital status with HBsAg status where a value of p<0.05 was found.~~

Table three showed that most of the family members were adults (49.4%), unmarried (57.3%) and had a highly educated level (59.6%). The statistical result showed that there was a significant relationship between Education and Marital status (*p-value* < 0.05) with HBsAg Status.

~~Discussion~~

HBV and HBsAg

Hepatitis B Virus (HBV) is a virus causing hepatitis infection, which has 45 – 120 days incubation period in the human liver cell. One of the body's immunologic response toward HBV is HBsAg (*Hepatitis B Surface Antigen*) formation. HBsAg could be a diagnostic detector of HBV. If a person has an HBsAg positive, he or she might get HBV as a carrier and could contaminate others via his or her body's fluid. But, if someone has an HBsAg positive more than six months, he has got chronic Hepatitis B[34].

On the first screening of this study, we could see there were 13.2 % of students with HBsAg positive. It meant that there were 13 students with HBsAg positive in every 100 students. It was almost twice from the national HBV prevalence (7.1%). All the students had an HBsAg vaccine when they're born due to the government's policy that newborn baby had to get HBsAg vaccine as a basic immunization. Unfortunately, even they've got the vaccine when they're born, they still got chronic HBsAg. This condition became an interesting topic to have further analyze.

Home Contact or Intrafamily transmission

~~There are two ways of HBV transmission[32]:~~

~~1. Vertical transmission~~

This transmission happens during the perinatal period. The contamination happens from the mother to the baby or known as Mother Transmission to Children. If the mother has HBsAg (+) and HBeAg (+), the baby will have a 90% chance of getting contaminated, and it usually becomes chronic. But if the mother has HBsAg (+) and HBeAg (-), the chance of contamination will be only 4%, and the baby is usually getting well.

~~2. Horizontal transmission~~

This transmission happens in a community, especially intra family. It happens through the contact of patients' body's fluid.

In this study, parents (55.6%) had a great contribution on HBV transmission among family members. There were some researches stated that HBV positive among spouses[26,31]. Vertical transmission happened from mother who had HBV to the newborn baby, and the baby could get chronic Hepatitis. Pregnant mother with HBsAg positive had a 98% chance to infect the fetus[7,8]. Some researchers also stated that parents with chronic Hepatitis B could be the risk factor for his family in California[35] and in Anhui, China[36].

Some of the respondents were over 16 years old in this study. This condition was the same as Bai Kusnadi (2011)[33] research that there was a significant relationship between age and HBsAg status. Most of them were usually using tools together, such as using nail clipper or comb or toothbrushes, sexual contact, heavy contact with siblings through a bite wound[34]. Other researchers stated that HBs Ag positive in intra family contact was around 23,3% di Arak, Iran[16], 2,3% di Nahavand, Iran[23], 10,6% di Guilan Province Iran[24], 37,1% di Hamadan cities[25], 30,5% di Turkey[26].

This study also found that there was a significant relationship between HBsAg positive toward education (*p-value*: 0.003; OR: 0.184) and marital status (*p-value*: 0.005; OR: 0.204). This result was in line with some researchers stated that there was a significant relationship between HBV infection with marital status, education an occupation in some nations such as South Brasil[15], Iran[27], Mesir[28], Turkey[29], Palestina[30].

Conclusion

The prevalence of HBsAg positive in Kupang City High School students was 13.2. The presence of family members with reactive HBsAg could transmit HBV to other family members. Family members with higher education 0.184 times are at risk of not being infected with hepatitis B compared with low education. Unmarried family members are 0.204 times more at risk of being uninfected compared to those who are married.

Conflict of Interests

The authors declare that there is no conflict of interests.

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